Nov. 11, 1947. C. K. DUNLAP 2,430,710

TEXTILE CONE

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Fig. 1.

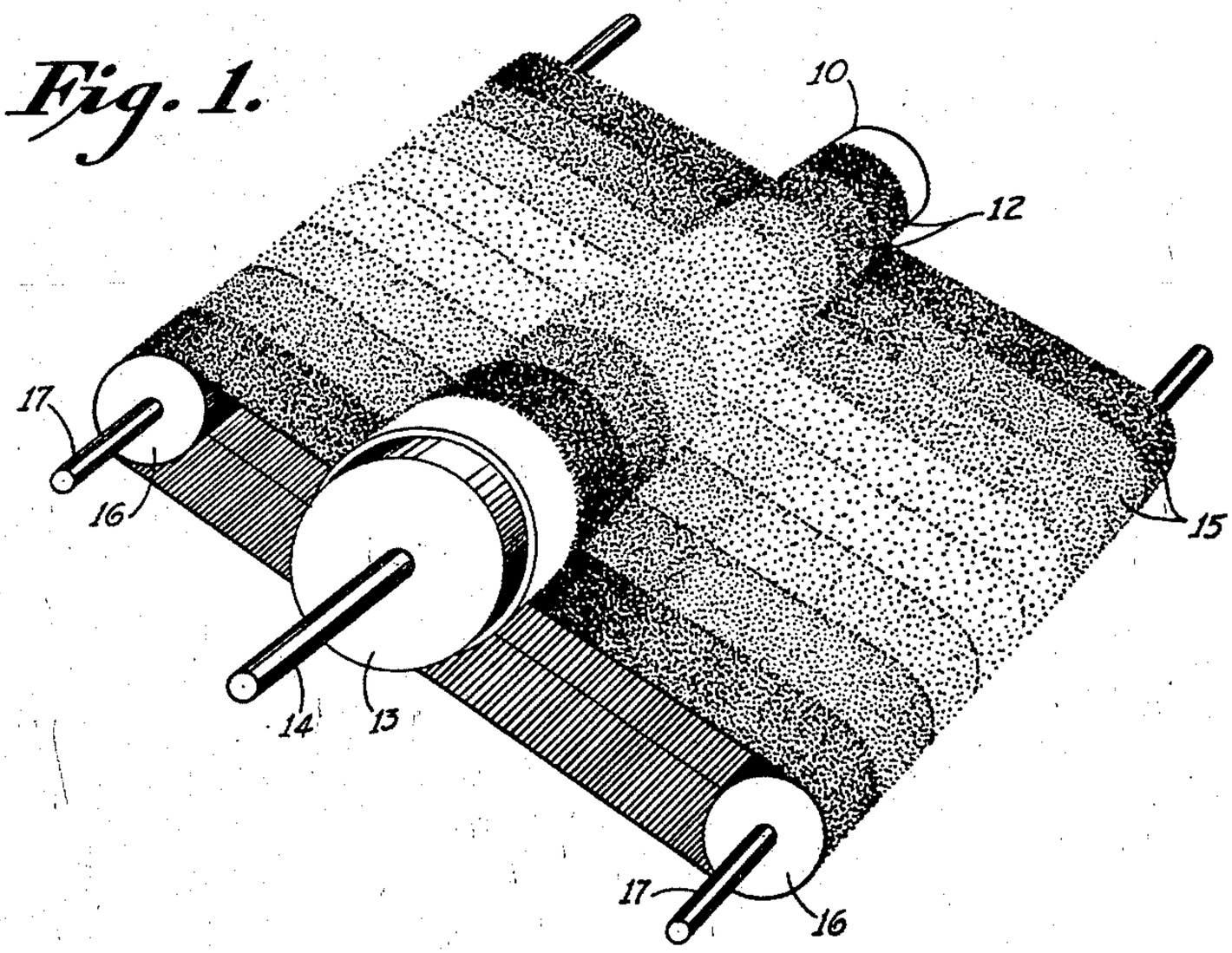

Fig. 2.

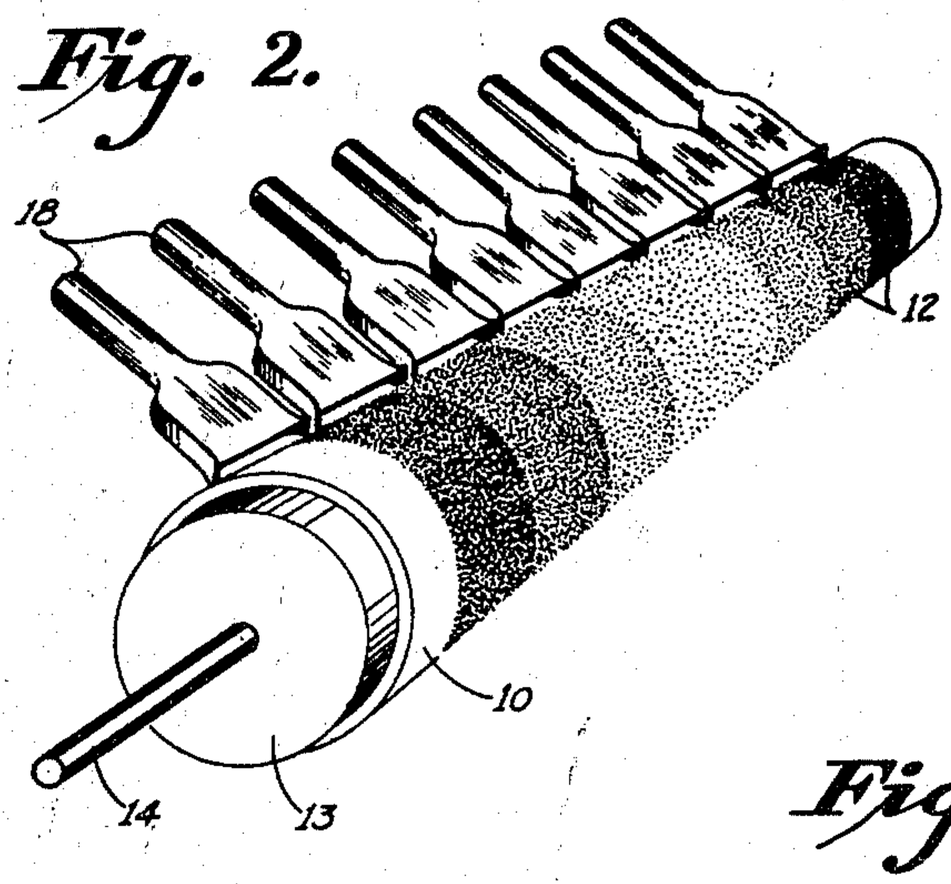

Fig. 3.

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TEXTILE CONE

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Application February 11, 1946, Serial No. 646,845

6 Claims. (Cl. 242—122)

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This invention relates to textile cones for supporting yarn packages and the like, and more particularly to a textile cone having a winding surface conditioned so as to secure a yarn package against slippage on the cone and at the same time allow the yarn to be delivered evenly from the package, and to a method for conditioning the winding surface in this manner.

It is common practice in the textile industry to use conical cores, particularly paper cores such as are contemplated by the present invention, to dispose yarn or the like for feeding into warping and other textile machinery. The yarn is disposed for this purpose by winding it on the cones so that a body of yarn of substantial size, commonly referred to as a yarn package, is built up on the cones. The winding operation is carried out on a machine which includes a traverse mechanism adapted to lay the yarn windings on the cone according to a helical pattern, the traverse mechanism reversing as each end of the cone is reached so that the helical winding pattern is formed in both directions on the cone and the yarn forms a loop at the end portions of the cone each time the traverse mechanism reverses to change the direction of winding.

The end loops formed in this manner during the winding operation have a pronounced tendency to slip on the cone during winding and subsequent use of the yarn package because the degree of wrap obtained when the direction of winding reverses is insufficient to anchor the end loops securely. It has accordingly been proposed to form the supporting cores with roughened or otherwise configurated end portions so as to provide a gripping surface which would secure the end loops against slippage. In my prior Patent No. 1,634,492, for example, there is disclosed a supporting core having a napped winding surface to improve its thread retaining qualities. This method of conditioning the winding surface has proved very satisfactory and has been used extensively.

In recent years, however, the variety of yarns has increased to such an extent that it has been found necessary to provide different types of winding surfaces for different varieties of yarn. Very fine, soft silk and rayon yarns are now being produced, for instance, which create a special problem because they are fragile and must be handled carefully to avoid breaking and fraying. If yarn of this type is wound on a supporting core having an evenly napped winding surface as shown in my above mentioned prior patent, the inner windings of the yarn becomes em-

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bedded in the napped surface, particularly the intermediate windings toward the longitudinal center of the core, and while difficulty with slippage is obviated under these conditions, the tension on the yarn varies substantially as the inner windings of the yarn package are withdrawn. This circumstance results from the fact that the end loops are relatively easily withdrawn from the winding surface because of their lesser degree of wrap, but the intermediate windings offer greater resistance and when these windings are embedded in a napped surface this resistance is accentuated so that the variation in tension is often sufficient to break the yarn. Particular difficulty in this respect is encountered in high speed warping machinery when it is desired to "magazine" the yarn packages so that they will transfer automatically. As this variation in tension occurs when the inner windings of a yarn package are being withdrawn just prior to transfer, if the difficulty with breakage is not cured the advantages of automatic transfer are lost because the break must of course be repaired before the next yarn package will feed.

One solution to this problem was disclosed in my prior Patent No. 2,219,836, which shows a supporting core having napped end zones for anchoring the end loops and an intermediate smooth winding surface designed to allow the intermediate windings to be withdrawn at substantially the same tension required to remove the end loops. This solution has not proved adequate in all situations, however, as with the fine silk and rayon yarns mentioned above, because of the difficulty of balancing the napped end zones satisfactorily in relation to the intermediate smooth portion. In order to maintain the end loops securely against slipping it is often necessary to provide a heavy napping at the end zones, but when this is done the variation in tension between the napped and smooth portions as the yarn is withdrawn from the winding surface becomes pronounced and the previously noted trouble with breakage is encountered.

According to the present invention, the above mentioned difficulties are avoided by an improved supporting core or textile cone having a winding surface conditioned with graduated thread retaining properties. The thread retaining properties are obtained by investing the winding surface with circumferential bands of discrete, extending fibers. These circumferential bands of extending fibers are arranged contiguously on the winding surface, the extending fibers of the bands at each end of the supporting

core being of sufficient length to secure the end loops of a yarn package against slippage on the winding surface, and the extending fibers on intermediate bands being of graduated lesser lengths toward the longitudinal center of the supporting core to allow the inner windings of the yarn package to be removed under substantially even tension from the winding surface.

The method of forming the textile cones of the present invention comprises generally forming a paper body adapted to serve as a supporting core for a yarn package and then investing the winding surface of the paper body with the discrete, extending fibers arranged in circumferential bands of graduated lesser fiber length from each end of the paper body toward its longitudinal center. As explained more in detail below, the winding surface may be invested with the circumferential bands of discrete, extending fibers by differential surface abrasion, or by conditioning the winding surface with a coating of extending fibers as by spraying or the like.

My invention is illustrated in the accompanying drawing in which:

Fig. 1 is a perspective view, mainly diagrammatic, illustrating the manner in which the winding surface may be conditioned by differential surface abrasion;

Fig. 2 is a similar view, illustrating the manner of applying a coating of the discrete, extending fibers on the winding surface; and

Fig. 3 is an elevation of a textile cone prepared in accordance with the present invention.

Referring at first to Fig. 3 of the drawing the textile cone of the present invention is shown as comprising a paper body 10 conveniently formed by winding a semi-circular blank upon itself to form a sturdy laminated paper structure, as indicated at 11, held together by a suitable adhesive applied to the paper blank before winding. The paper body 10 may be made up from any suitable paper stock, such as Kraft stock, and instead of a wound laminated paper body as described above a molded paper body may be used, if desired.

The circumferential bands of discrete extending fibers are indicated at 12. As mentioned above, the circumferential bands 12 are arranged in graduated fiber lengths, the circumferential band of extending fibers at each end of the paper body 10 being of sufficient length to secure the end loops of inner windings of a yarn package against slippage and the intermediate circumferential bands being of graduated lesser lengths toward the longitudinal center of the paper body 10.

The manner of investing the winding surface of the paper body 10 with the circumferential bands of extending fibers 12 is illustrated in Figs. 1 and 2. In Fig. 1 a method of differentially surface abrading the paper body 10 to condition it with the circumferential bands 12 is illustrated. According to this method the paper body 10 is mounted on a mandrel 13 which is disposed for rotation in any suitable manner as on a spindle 14 or the like.

The differential surface abrasion is carried out with endless abrasive bands 15 trained over rollers 16 which are mounted for rotation on shafts 17. The endless bands 15 are disposed contiguously on rollers 16 and are selected in varying degrees of fineness according to the graduation in fiber length desired for the circumferential bands 12. Coarser bands 15 are arranged on the outside in relation to each end of paper

body 10, and the coarseness of these outer bands 15 is selected to obtain extending fibers on the paper body 10 of sufficient length to secure the end loops of inner windings of a yarn package against slippage. The intermediate bands 15 are correspondingly selected with progressively finer abrading surfaces so that the intermediate circumferential bands 12 formed on the paper body 10 will be of graduated lesser lengths toward the longitudinal center of the paper body 10 as described above.

In operation, one of the rollers 16 is driven in any suitable manner (not shown) to cause movement of the endless bands 15 in relation to the supporting mandrel 13, and a paper body 10 is placed on the mandrel 13 to dispose it in abrading contact with the bands 15. The surface abrading effect obtained in this manner conditions the winding surface of the paper body 10 so that circumferential bands of discrete fibers of the paper body are disposed in an extending position to form a thread retaining surface. The method of differentially surface abrading the paper body with abrasive bands of varying degrees of fineness allows the character of these circumferential bands to be adjusted in graduated fiber lengths so that balanced thread retaining properties may be obtained as explained above.

In Fig. 2 an arrangement is shown for investing the paper body 10 with the circumferential bands of extending fibers 12 by coating the paper body 10 with sprayed flock, such as cotton or rayon flock, or the like. For this purpose, the paper body 10 is again mounted on a rotating mandrel 13 carried by a spindle 14, and is disposed in relation to the discharge tubes 18 of suitable spraying equipment. A separate discharge tube 18 may be provided for each circumferential band 12 desired, so that flock of a desired fiber length may be sprayed on to the paper body 10 at the position of each circumferential band 12. In this instance, the paper body 10 is first coated with a suitable adhesive for securing the sprayed flock in place, and is then placed on mandrel 13 and rotated until an adequate covering of flock sprayed from discharge tubes 18 has been obtained on the paper body 10.

Textile cones formed in accordance with the present invention may be adapted readily for use with particular types of yarn. The width and number of the circumferential band 12 may be varied, as well as the fiber lengths selected for each particular band, to condition the winding surface with the necessary graduation in thread retaining properties for smooth removal of the inner windings of the yarn package, and textile cones conditioned in this manner provide a means, as mentioned above, for eliminating the troublesome difficulties encountered with breakage at transfer in high speed warping machinery and the like.

I claim:

1. A textile cone adapted to serve as a supporting core for a yarn package wound thereon comprising a paper body having a winding surface conditioned with discrete, extending fibers to secure the inner windings of said yarn package against slippage on said paper body during winding and subsequent use of said yarn package, said discrete, extending fibers being arranged in contiguous circumferential bands of graduated fiber length longitudinally of the winding surface of said paper body, the circumferential band of ex-

tending fibers at each end of said paper body being of sufficient length to secure the end loops of inner windings of a yarn package wound on said textile cone against slippage on said winding surface, and the intermediate circumferential bands being of graduated lesser lengths toward the longitudinal center of said paper body to allow the inner windings of said yarn package to be removed under substantially even tension from said winding surface.

2. A textile cone adapted to serve as a supporting core for a yarn package wound thereon comprising a paper body having a winding surface conditioned by differential surface abrasion with discrete, extending fibers to secure the inner windings of said yarn package against slippage on said paper body during winding and subsequent use of said yarn package, said discrete, extending fibers being arranged by virtue of said differential surface abrasion in contiguous circumferential bands of graduated fiber length longitudinally of the winding surface of said paper body, the circumferential band of extending fibers at each end of said paper body being surface abraded in a degree sufficient to provide extending fibers of adequate length for securing the end loops of inner windings of a yarn package wound on said textile cone against slippage on said winding surface, and the intermediate circumferential bands being surface abraded in a progressively lesser degree disposing the extending fibers of the intermediate bands in graduated lesser lengths toward the longitudinal center of said paper body to allow the inner windings of said yarn package to be removed under substantially even tension from said winding surface.

3. A textile cone adapted to serve as a supporting core for a yarn package wound thereon comprising a paper body having a winding surface conditioned with a coating of discrete, extending fibers to secure the inner windings of said yarn package against slippage on said paper body during winding and subsequent use of said yarn package, said coating of discrete, extending

fibers being arranged in contiguous circumferential bands of graduated fiber length longitudinally of the winding surface of said paper body, the circumferential band of extending fibers at each end of said paper body being of sufficient length to secure the end loops of inner windings of a yarn package wound on said textile cone against slippage on said winding surface, and the intermediate circumferential bands being of graduated lesser lengths toward the longitudinal center of said paper body to allow the inner windings of said yarn package to be removed under substantially even tension from said winding surface.

4. The method of preparing a textile cone which comprises forming a paper body adapted to serve as a supporting core for a yarn package wound thereon, and then investing the winding surface of said paper body with discrete, extending fibers arranged in contiguous circumferential bands of graduated lesser fiber length from each end of said paper body toward its longitudinal center.

5. The method of preparing a textile cone which comprises forming a paper body adapted to serve as a supporting core for a yarn package wound thereon, and then differentially surface abrading the winding surface of said paper body to condition said winding surface with discrete, extending fibers arranged in contiguous circumferential bands of graduated lesser fiber length from each end of said paper body toward its longitudinal center.

6. The method of preparing a textile cone which comprises forming a paper body adapted to serve as a supporting core for a yarn package wound thereon, and then investing the winding surface of said paper body with a coating of discrete, extending fibers arranged in contiguous circumferential bands of graduated lesser fiber length from each end of said paper body toward its longitudinal center.

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